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# SURVEY NOTES

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## THRUST BELT UPDATE

by Howard R. Ritzma,  
Assistant Director, UGMS

Drilling activity in the Thrust Belt of southwest Wyoming and northeast Utah has continued to make this area one of the busiest in the U. S. for oil and gas exploration and discovery.

### WYOMING — BIG NEW FIELDS

Many of the most significant and spectacular new discoveries have occurred just to the east of the Utah-Wyoming border in Uinta County, Wyoming. Evanston, the county seat, has suddenly been nearly surrounded by large new producing fields. Dozens of drilling rigs dot the ridges and valleys in search of new fields and extensions to existing ones.

New fields in Uinta County (with discovery dates) include Ryckman Creek (1975), Yellow Creek (1976), Painter Reservoir (1977), Whitney Canyon (1977), and Clear Creek (1978). Carter Creek (1978) is in Lincoln County and may extend south into Uinta County.

The Wyoming fields have been discovered along sharply folded, north-south trending anticlines that parallel the leading edges (surface traces) of the Absaroka and Tump-Medicine Butte thrust sheets (figure 1). The most favorable juxtaposition of source beds and reservoir rock seems to be found along these thrust sheets where organic Cretaceous rocks are in fault contact at depth with overlying porous and permeable formations of Paleozoic, Triassic, and Jurassic age in the superjacent thrust sheets. Many

of the fields are characterized by multiple reservoir formations and thick producing intervals measurable in 1000's of feet. Production is from reservoirs of Ordovician to Jurassic in age and includes gas, condensate, and oil, some highly sulfurous.

Whitney Canyon appears to be a giant gas-condensate field with thick pays in Triassic, Permian, Pennsylvanian, Mississippian and Ordovician formations. Other fields have reserve estimates which certainly place the Thrust Belt area of southwest Wyoming as an area with giant prospects in the future oil and gas supply of the nation.

### UTAH — PINEVIEW AND MORE MODEST FINDS

The Thrust Belt "play" began with the 1975 discovery of Pineview Field in Summit County about 15 miles up Chalk Creek valley east of Coalville. The field is a giant with current reserves estimated at 170 million barrels of oil and 180 billion cubic feet of gas. At 1979 prices (and dollars), Pineview should yield 3.5 to 4.0 billion dollars in product during its life.

By 1979 about 70 wildcat wells drilled in the Thrust Belt in Summit, Rich and Morgan Counties have resulted in the discovery of five additional fields (see table, p. 3). All of these appear to be of much more modest size than Pineview, although the Anschutz Ranch discovery still remains to be defined as to size. To the middle of 1979 three fields — Anschutz Ranch, Elkhorn Ridge, and South Lodgepole — have not achieved production beyond initial tests.

*continued on page 2*



## ALLOSAURUS FRAGILIS WINS

Utah now has a state fossil. Since there is a state flower, bird, tree, animal, fish, and mineral, why not a fossil? James Madsen, State Paleontologist with the Utah State Historical Society, decided to remedy the omission and asked Utah State Fair-goers to vote for their favorite among seven fossils that are commonly found in Utah. The dinosaur won. The State Legislature will be asked to make the selection official.

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## THRUST BELT UPDATE

*continued from page 1*

The Hogback Ridge discovery, the first well drilled in Rich County, was completed as one of the largest new gas wells in the Rocky Mountain region in recent years. However, early estimates of reserves for this field were revised downward drastically after two offsetting dry holes were drilled to the north and southeast. Hogback Ridge produces from the single well, but a large shut-in gas reserve lies at depth in the field. This is not producible at present because of the high sulfur content of the gas and lack of a facility to treat it for pipeline transport.

Exploration for oil and gas continues at a steady pace in Utah's Thrust Belt

counties. Each well, successful or dry, contributes new knowledge to the complex structural jigsaw puzzle which is being assembled piece by piece from surface and seismic mapping and well data. Some of the geology is startling — one well near Henefer, Summit County, penetrated more than 7,500 feet of salt. A salt dome in the Wasatch?

The search for oil and gas in Utah's portion of the Thrust Belt to date has cost about \$100,000,000. The payoff is additional energy supply for the region and the nation for decades to come, a promise steadily growing to reality.

The high level of leasing and drilling activity in southwest Wyoming and northern Utah has been largely sustained by

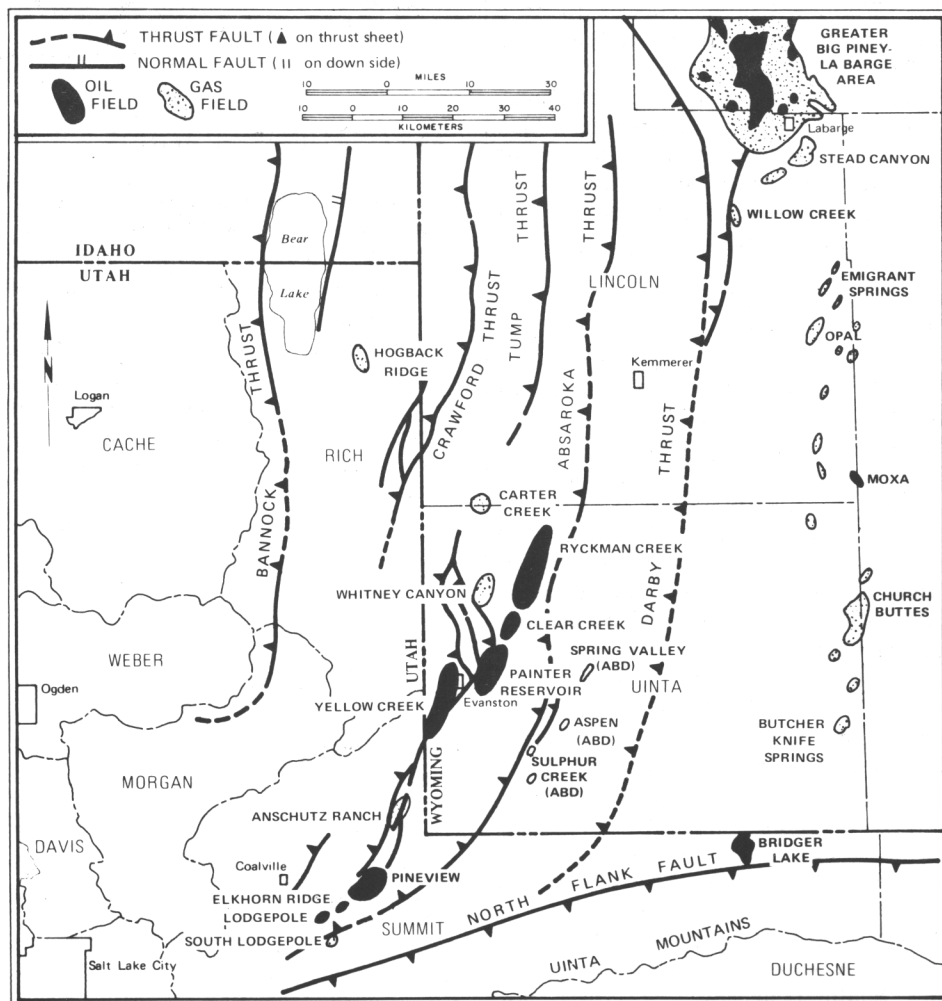


Figure 1. Oil and gas fields in the southern portion of the Thrust Belt.

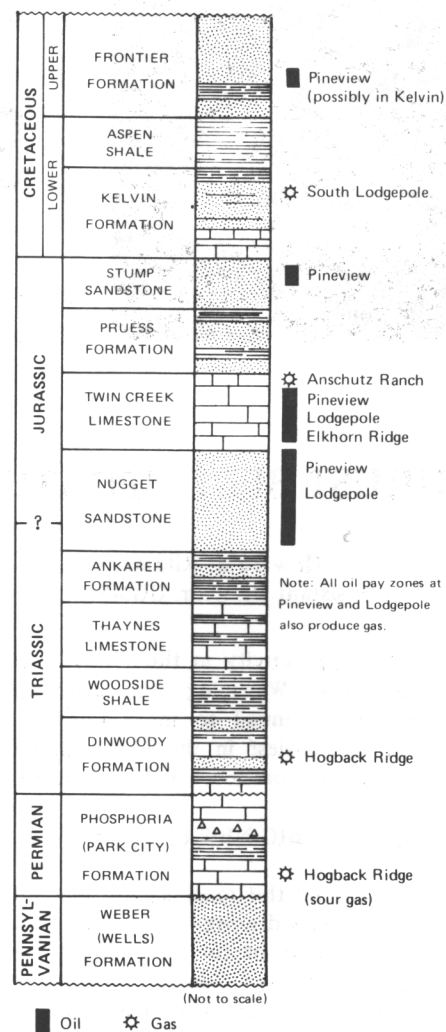


Figure 2. Generalized stratigraphic section in Utah Thrust Belt area showing petroleum pay-zones of new fields.

the abundance of privately owned, leasable lands, especially the extensive Union Pacific land grant. Utah's oil-prospective Thrust Belt area, in southern Rich, western Summit and Morgan Counties, is almost 100% private and State lands. Leasing and drilling has been brisk, unimpeded by the red tape, interminable studies, bureaucratic harassment, and litigation experienced on Federal lands elsewhere in the region.

It is safe to say that much of the vitally important new oil and gas discovered for Utah's and the nation's benefit would still be underground if favorable geology and land ownership had not fortuitously coincided in, at least, this one part of the Thrust Belt.

TABLE 1. PRODUCTION FIGURES FOR UTAH'S THRUST BELT FIELDS

Year - Field	Hogback Ridge Rich County	Lodgepole Summit County	Pineview Summit County
1975 (Oil)			225,000
(Gas)			172,000
1976 (Oil)		discovered	867,000
(Gas)		1977	846,000
1977 (Oil)	discovered	14,000	4,243,000
(Gas)	1977	0	4,354,000
1978 (Oil)	0	83,000	5,256,000
(Gas)	1,025,000	26,000	5,378,000
1979 (Oil)	0	60,000	2,061,000
(Gas)	620,000	22,000	2,136,000
Cumulative to (Oil)	0	158,000	12,654,000
6/30/79 (Gas)	1,645,000	47,000	12,887,000
Producing-productible Wells - 6/30/79	1-1	3-5	20-32
Pay Zones	1	2	4
No Production to date:	Anschutz Ranch, Summit County, discovered 1978. Elkhorn, Summit County, discovered 1977. South Lodgepole, Summit County, discovered 1978.		

All data in barrels of oil and mcf (1000's of cubic feet) of gas. Data from Utah Division of Oil, Gas & Mining. Compiled by Karl Brown.

## OFF-ROAD VEHICLE TRACKS TRIGGER OGDEN FLOOD

Damage from the August 18 catastrophic flooding in Ogden was the consequence of terrain modification by off-road vehicles, says UGMS Engineering Geologist, Bruce N. Kaliser. Kaliser inspected the foothill area above the affected Ogden residential neighborhood August 20.

Bedrock, buried at depths of only one to six inches, was stripped clean of vegetation and soil cover in many places above the Pineview Canal. Roads and paths created by four-wheel drive vehicles and trail bikes were responsible for diversion of flood runoff across areas of loose soil rather than down existing natural drainageways and channels. These unnatural water paths collected debris and funneled it into the open Pineview Canal.

"Had the water reached the natural paths, the debris would have flowed across sections of the canal that were purposely covered. Pineview Canal would not have been blocked," Kaliser said.

"The benchland and foothill soils are loose, granular deposits that are easily eroded. Trail bikes and four-wheel drive vehicles clawing their way up these steep slopes destroy the vegetation and create ruts that quickly grow into gullies after intense rainfall," Kaliser explained. "The problem is widespread along the urbanized Wasatch Front. Thoughtless use of off-road vehicles in the foothills above residential areas is not only a continual nuisance but also a serious environmental hazard".

## U-MILL TAILING RADIATION SURVEY

An aerial radiation survey over Salt Lake City was performed in late October by the DOE to gather information on radiation in mill tailings at or near inactive uranium processing sites. Mill tailings, which produce low-level radiation, are the solid wastes left after the uranium has been removed from the ore. The survey, made from a helicopter flying as low as 150 feet from the ground, was carried out in cooperation with the state of Utah.

from DOE News Release 10-22-79.

## COAL RECLAMATION STUDY FUNDED

The Utah Division of Oil, Gas and Mining has been awarded \$141,380 by the federal government to develop rules and regulations to evaluate the capacity of land areas in Utah to support and permit the reclamation of coal mining operations. In 1979 the State passed a Coal Reclamation Act; the rules and regulations are expected to be drafted by early 1980.

Utah's coal production has increased from 4,733,000 tons in 1970 to 9,252,800 tons in 1978.

from U. S. Dept. of Interior News Release

## PARK CITY MINE TO REOPEN

The Ontario No. 3, shut down since February, 1978, will be reopened by Noranda Exploration, Inc. and Pamour Porcupine Mines, Ltd. A lease on the property has been assumed from the United Park City Mines Co., which leased the property to Park City Ventures in 1970. A 750 tpd mine and mill were brought into production by Anaconda Co. and Asarco, Inc. Noranda plans to rehabilitate the mine and resume production. Park City Ventures has been paid \$500,000 for its lease and is to receive \$3 million over the next three years plus one third of any profits.

UGMS Director Don McMillan attended a field trip to the mine and vicinity on August 24 to inspect the drain tunnel and the bottom workings.

## NEW SHALE-OIL RECOVERY TECHNIQUE

A new process that heats oil shale and tar sands in place with radio-frequency electrical fields may provide a way to extract liquid and gaseous hydrocarbons without surface disturbance, mining, need for large quantities of water, or problems of waste disposal. Field tests are being conducted on Texaco-owned property in Uintah County, Utah. The process is being developed by Texaco, Inc., Rathcon Co., and its subsidiary, Badger Co. A special heat-pumping unit, lowered into a small-diameter vertical hole, also acts as a conduit for bringing the oil to the surface.

from Petroleum Institute Report 10-18-79.

# DIGGIN'S

## GSL OPENS NEW SOLAR SALT PROCESSING PLANT

The first major new salt processing plant to be opened in the United States in twenty years is located at Great Salt Lake Minerals and Chemical Corporation's production complex near Ogden, Utah. The new plant increases the company's salt processing capacity by more than 300,000 tons per year. GSL operates the nation's largest multi-product solar evaporation complex, and covers 17,000 acres. Primary products are sulfate of potash, salt, and sodium sulfate.

*GSL News Release*

## 50 UTAH OIL FIELDS

... are discussed in the 762-page *Oil and Gas Fields of the Four Corners Area*, published by the Four Corners Geological Society, Durango, Colorado. Vital statistics are given for each of the 243 oil and gas fields in the Four Corners Area, including history, production figures, maps, and type logs. The book is available for \$75.00 from the Society.

## URANIUM HUNT

A \$305,500 DOE contract was awarded to Himes Drilling Company, Grand Junction, Colorado, to drill 9 holes in the San Rafael Swell area, Utah, as part of the search for uranium. Himes Drilling Company did the drilling and coring for the UGMS tar sand project.

## USGS OIL SHALE/TAR SAND MAPPING

USGS geologic mapping in the important oil shale and tar sand region of the southeast Uinta Basin now includes nine 7½" quadrangles: Banty Point, Walsh Knolls, Weaver Ridge, Southam Canyon, Rainbow, Burnt Timber Canyon, Cooper Canyon, Bates Knolls, and Agency Draw, NE.

Banty Point is part of the GQ series. The others are part of the MF series. All are available from the USGS Public Inquiries Office, Room 8015 Federal Building, 125 S. State, Salt Lake City, Utah, 84138.

## EMERY COUNTY MINE SETS WORLD COAL PRODUCTION RECORD

14,699 tons in 24 hours is the record set by the Deer Creek mine in Emery County, Utah, on August 13, 1979. The coal was mined from a single longwall mining unit by the Emery County Mining Corporation. Deer Creek is one of five mines in Emery County owned by Utah Power and Light Co.

*Mining Congress Journal*, 9-79, p. 10.

## BLEACHING EFFECT

A short "discussion" note appears in the September 1979 issue of the AAPG Bulletin describing the bleaching of natural color in beds within Utah's oil-impregnated sandstone deposits. The paper, by Jock A. Campbell and Howard R. Ritzma, discusses and adds information to a paper by T. J. Donovan and others, "Aeromagnetic detection of diagenetic magnetite over oil fields" which appeared in the February 1979 number of the AAPG Bulletin.

## WEIGHTY OIL-GAS STUDY

Carlton Stowe's 1,700 page report, "Utah Oil and Gas Industry, Past and Present" published by the Utah Engineering Experiment Station in September, 1979, is a comprehensive compilation of all available source data designed to assist in assessing the potential of the state's oil and gas industry. It includes a narrative account of the development and growth of the oil and gas industry in Utah, and comprehensive statistical information. Taxes, rules and regulations, production and refining data, and the impact of oil and gas exploration in Utah are brought up to date.

To give credit where credit is due, Carlton compiled the book on his own time and under the auspices of the Utah Engineering Experiment Station, and not for the Utah Geological and Mineral Survey as reported in the Salt Lake Tribune on October 5, 1979. However, some of the information in the book came from UGMS publications and files.

## HEAVY OIL TREATMENT PLANT CONSIDERED BY AMOCO

If production of oil from the Great Salt Lake is sufficient, Amoco may install a treatment plant north of the lake. The crude oil from the lake has a very high sulfur content (about 11%) and is highly corrosive. The oil is also heavier than water and solidifies below 100° to 115° F. The plant would be designed to remove the sulfur and treat the oil to make it easier to transport by pipeline.

## American Mining Congress: NON-FUEL MINERAL THREAT

Senator James A. McClure (R-Idaho), in his address to the American Mining Congress on September 23, 1979, drew a direct parallel between the oil crisis of today and the possible mineral crisis of tomorrow. The AMC program focussed on the problems of governmental regulations and the national defense implications of the U. S. Minerals policy. Simon Strauss, chairman of the AMC Minerals Availability Committee, warned of the serious danger of continuing to rely on politically unstable countries for America's non-fuel mineral supply.

*AMC News Bulletin*, No. 20-79, Oct. 5

## EASTERN THRUST BELT REDEFINED

While the petroleum and gas exploration in the Wyoming thrust belt is getting attention in the western part of the United States, the eastern part has discovered that it may have more overthrust that was once believed. Recent seismic surveys indicate that the eastern overthrust belt of Paleozoic sediments, long a vital source of oil and gas production, may extend from 60 to 100 miles east of the western edge of the crystalline Blue Ridge and Piedmont. There appear to be from 10,000 to 20,000 feet of sediments buried under from 5,000 to 10,000 feet of crystalline rock.

*Department of Interior News Release*



## UTAH'S OIL PRODUCTION... GIANT FIELDS PUMP HUGE SHARE

In 1978 Utah's oil and gas fields produced 31,368,154 barrels of oil and 5,282,144 barrels of gas liquids for a total of 36,650,298 barrels. There were also 3,633 barrels of oil from shale.

Howard Ritzma, new Chief of the UGMS Petroleum section, emphasizes the importance of Utah's oil field giants. In 1978, the top four fields in production produced 90.6% of the state's total and the top 10 produced 98.3%. The other 1.1% came from about 55 small fields or producing areas.

In Utah's 30 years of commercial production, about 650 million barrels of oil have been produced; 45% of this — 292.4 million — has come from a single field, Greater Aneth. Utah's top four fields account for 85.7% of the oil produced through 1978 and ten fields for 96.5%. The other 3.5% has been contributed by about 120 small fields and producing areas.

The importance of the Thrust Belt is pointed up dramatically. Pineview field, with 31 wells producing only since 1975, was Utah's third largest producer in 1978 and already is seventh in cumulative production.

Gasoline plants producing gas liquids are located in the Greater Altamont-Bluebell; Greater Aneth, Pineview, Greater Red Wash, and Lisbon Fields. If the 5.3 million barrels of gas liquids produced in these plants were included with the oil production of these fields, the percentage of total production would be even more overwhelming for Utah's oil field "giants".

### PETROLEUM SWITCH

Howard Ritzma, Assistant Director, has been assigned additional duties as Chief of the UGMS Petroleum Section to replace Dr. Jock A. Campbell who resigned to join the geology faculty of West Texas State University. Karl W. Brown, formerly with the Utah Department of Transportation, has joined the UGMS staff as Petroleum Geologist.

## PRODUCTION FROM UTAH'S GIANT OIL FIELDS SINCE 1978

Field	Year of discovery	1978 Production (bbls.)	Average bbls/day	% State Total 1978	Cumulative Production Thru 1978 (rank-cum.)	% State Total (cum.)
GR. ALTAMONT-BLUEBELL Duchesne, Uintah County	1970	12,266,598	33,607	39.1	115,139,756 (2)	17.7
GREATER ANETH San Juan County	1956	7,330,537	20,084	23.4	292,351,348 (1)	45.0
PINEVIEW Summit County	1975	5,250,979	14,386	16.7	10,585,767 (7)	1.6
GREATER RED WASH Uintah County	1951	3,577,792	9,802	11.4	108,155,019 (3)	16.6
LISBON San Juan County	1960	874,971	2,397	2.8	41,470,635 (4)	6.4
UPPER VALLEY Garfield County	1964	833,196	2,283	2.7	17,731,021 (6)	2.7
BRIDGER LAKE Summit County	1966	318,372	872	1.0	9,694,958 (9)	1.5
BOUNDARY BUTTE San Juan County	1948	158,222	433	0.5	4,275,098 (10)	0.7
ASHLEY VALLEY Uintah County	1948	139,816	383	0.4	18,384,449 (5)	2.8
ISMAY-FLODINE San Juan County	1956	98,151	269	0.3	9,704,143 (8)	1.5
OTHER FIELDS (see note below*)	---	519,520	1,423	1.7	22,115,256	3.5
TOTAL ALL FIELDS	---	31,368,154	85,940	100.0	649,607,450	100.0

\* About 120 fields (or producing areas) have contributed to the 30-year cumulative total. About 65 of these produced in 1978.

## GEOHERMAL PROGRESS

### GEOHERMAL DRILLING

As part of a DOE field demonstration project (PON), Utah Roses, Inc. is drilling a 1,000-5,000 foot geothermal exploration production hole at its present location on 9000 South Street in Sandy, Utah. Drilling began in late October and should be completed by the end of November. The thermal water, if found, will be used to heat 6 acres of existing greenhouses. Utah Roses, Inc. is also drilling a production hole at Crystal Hot Springs to obtain thermal water for a new greenhouse facility to be built adjacent to the State Prison facilities near Draper.

### GEOHERMAL ENERGY MAPS

DOE Geothermal energy maps are now available for Nevada, Oregon, and Arizona. Maps for Utah, Idaho and Montana will be available in a few months. The maps are being prepared in cooperation with the National Oceanic and Atmospheric Administration and the U. S. Geological Survey's geothermal assessment program. A limited number of these maps are available from Dr. L. L. Mink, DOE, Idaho Operations Office, 550 Second Street, Idaho Falls, Idaho, 83401.

*From DOE News Release 10-22-97*

## SYMPOSIUM: EARTHQUAKE RISK TO WATER WORKS

UGMS is co-sponsoring a symposium titled "Reduction of Earthquake Risk to Public Water Works Facilities" to be held at Salt Lake City's Ramada Inn on Friday, November 9, 1979. Announcement of the symposium, which is to be held during the hours of 9:00 a.m. to 1:30 p.m., went out during the week of October 15th. Bruce N. Kaliser, Survey Chief Engineering Geologist and Chairman of the Lifelines Committee, State Seismic Safety Advisory Council, organized the symposium with co-sponsors, The American Water Works Association, Utah League of Cities and Towns, Utah Bureau of Public Water Supplies and the State Seismic Safety Advisory Council. The purpose of the symposium is to acquaint the planners and operators of public water works with the full gamut of aseismic considerations in the development of their water systems.

Of particular significance at this time is recent state primacy of the Safe Drinking Water Act which includes siting requirements with respect to seismic and related geologic hazards.

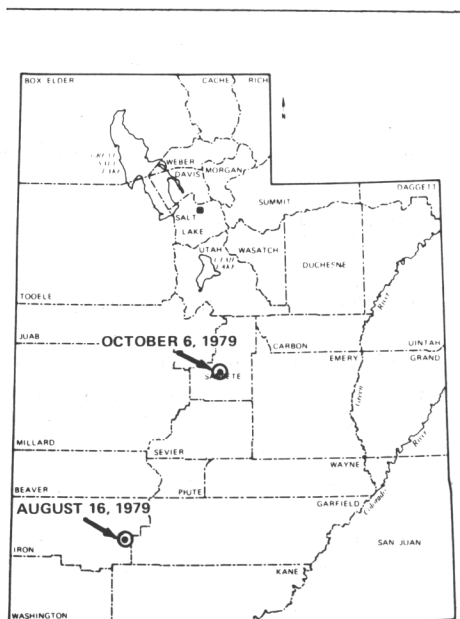


Figure 2. Locations of felt earthquakes in Utah, July 15 thru October 15, 1979.

## LAKE BONNEVILLE SEDIMENTS ON THE SOUTHEASTERN SIDE OF ANTELOPE ISLAND

Huge sand and gravel pits have been opened on the southeastern side of Antelope Island (figure 1). The material is loaded onto a 13-mile long conveyor belt and carried to a stockpile and loading facility near 5600 West on the construction site of Interstate 80 between Redwood Road and Saltair.

Fitzhugh D. Davis, Environmental Geologist, and Paul A. Sturm, Research Geologist, visited the pits on September 12, 1979, accompanied by John Romijn of the Utah Department of Transportation. Only pits 1 and 2 of four planned sand and gravel pits are presently being excavated. The properties are optioned from the Island Ranching Company, a subsidiary firm of the Anschutz Corpora-

tion.

The pits are being mined in benches about 9 to 15 feet high. A total of 25 to 35 feet of Lake Bonneville (Pleistocene) and Holocene deposits have been exposed thus far. A great variety of sediments appear to be present: shore, offshore, and deeper lake deposits. Paleosols that represent intervals of lake desiccation may also be present. Three areas in the pits were examined rather cursorily. Several unconformities are recognizable in the exposed pit walls.

After the construction of I-80 the pits will be smoothed out and hillsides recontoured. Some of this reclamation may take place as areas are mined out.

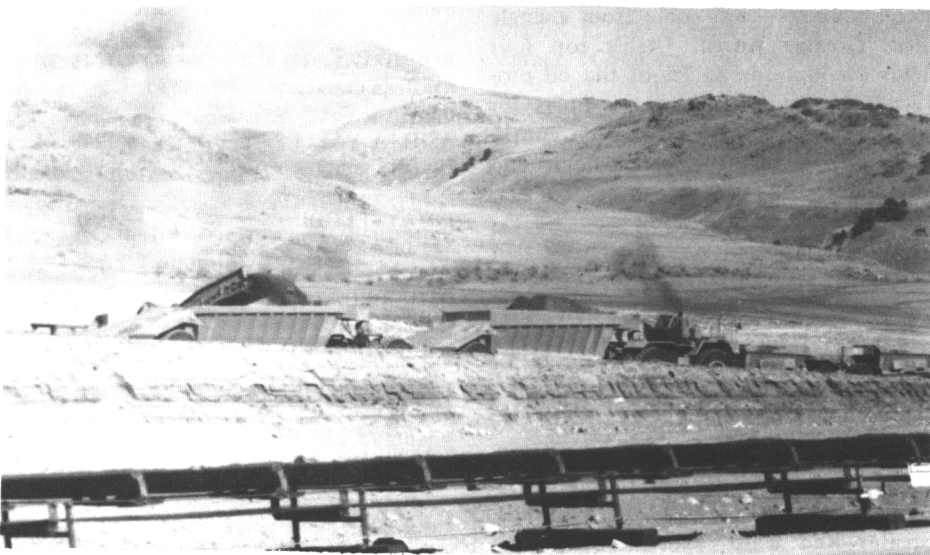


Figure 1. View of sand and gravel pit on Antelope Island. Note conveyor belt in foreground.

## UTAH EARTHQUAKES July 15 through October 15, 1979

Two isolated small tremors were felt in Utah the past quarter; one was located in Cedar City, and the other near Ephriam in the Sanpete Valley. There were no reports of damage or injuries (see figure 2).

Preliminary data given by the University of Utah Seismograph Station are as follows:

Local date	Local time (MDT)	Latitude	Longitude	Magnitude
16 Aug. 79	11:33 A.M.	37°N 45.79'	112°W 43.04'	3.6 (Cedar City)
6 Oct. 79	4:12 A.M.	39°N 17.18'	111°W 41.23'	3.2 (Ephriam)

## DATED PLEISTOCENE WOOD FOUND BY GEOTHERMAL DRILLS

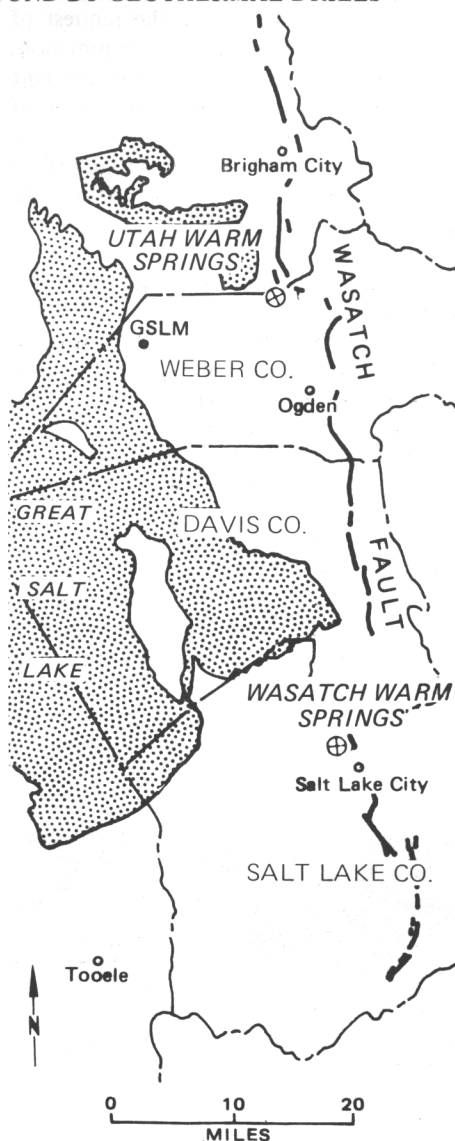
Preliminary radiocarbon age determinations on samples of wood recovered from two geothermal gradient holes recently drilled by the UGMS show late Pleistocene age. The holes were drilled just west of the Wasatch Fault and east of Great Salt Lake (figure 1). One sample, from a depth of 70 feet in a hole at Utah Warm Springs north of Ogden, produced a date of  $27,100 \pm 600$  radiocarbon years before the present (B. P.). The other, from a depth of 130 feet in a hole at Wasatch Warm Spring in Salt Lake City, has an age of  $22,600 \pm 400$  radiocarbon years B. P.

Both samples were recovered from zones of porous, unconsolidated clayey sand with some well rounded gravel, suggesting rapid burial of the wood. Wood chips and organic muck in Lake Bonneville sediments are often reported from wells along the Wasatch Front.

The Wasatch Warm Spring site is at the foot of City Creek Canyon, and presumably received a large quantity of sediment from that source. The Utah Warm Spring site is within  $\frac{1}{2}$  mile of the mouths of several small drainages.

Age determinations were made by the U. S. Geological Survey Radiocarbon Laboratory.

Figure 1. Locations of wells east of Great Salt Lake in which Pleistocene wood was found.



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## NEW UGMS PUBLICATIONS

The UGMS Special Studies series has been reinstated to replace UTAH GEOLOGY, and to expedite the publication of technical papers or collections of papers on related subjects.

Special Studies 49, *Coal Studies*, is a collection of three papers:

1. *Methane Content of Utah Coals*, by H. H. Doelling, A. D. Smith and F. D. Davis.

2. *Observations on the Sunnyside Coal Zone*, by H. H. Doelling, A. D. Smith, F. D. Davis, and D. L. Hayhurst.

3. *Chemical Analyses of Coal from the Blackhawk Formation, Wasatch Plateau Coal Field*, by J. R. Hatch, R. H. Affolter and F. D. Davis.  
104 pages, 1 plate. Price is \$3.50 over the counter or \$4.25 by mail.

Special Studies 50 is the *Geology and Petroleum Resources of the Major Oil-Impregnated Sandstone Deposits of Utah*, by Jock A. Campbell and Howard R. Ritzma, 10 figures, 12 tables, 24 p.  
\$2.00 over the counter or \$2.75 by mail.

Circular 61 is the *Bibliography of Utah Geology, 1978*, 24 pages, price \$1.00 over the counter or \$1.75 by mail.

Circular 62 is an up-to-date list of Utah Geological and Mineral Survey Publications, 26 pages, \$1.00 over the counter or \$1.75 by mail.

Circular 63 is the up-dated *Rockhound Guide to Mineral and Fossil Localities in Utah* and is at press. It has information for collectors as well as how-to-get there instructions for over 100 localities. 75 pages, 18 figures, \$2.50 over the counter, and \$3.25 by mail.

## UTAH GEOLOGY: R. I. P.

The Fall 1979 issue of UTAH GEOLOGY, now available, will be the last. In its place the Special Studies series will be reintroduced with SS 49, and SS 50, (see listing above).

## LAKE LEVEL DROPS

Gages read by the U. S. Geological Survey record a continuing steady fall in the level of Great Salt Lake, reflecting the unusually dry, hot summer of 1979.

DATE	BOAT HARBOR (South Arm)	SALINE (North Arm)
August 1	4198.70	4197.55
August 15	4198.35	4197.40
September 1	4198.15	4197.15
September 15	4197.85	4196.95
October 1	4197.65	4196.80
October 15	4197.50	4196.65

The boat harbor level has dropped 2.40 feet since the annual peak in May 1979 and is now as low as it has been since 1971.

UNFORTUNATE REOCCURRENCE:  
TRENCH COLLAPSES, BURIES MAN

The first recorded death by burial in a trench cave-in in Utah was in Willow Valley in 1826, where a mountain man named Marshall was digging a cache in which he intended to store the fruits of his fall beaver hunt. He was killed when the walls of the cache caved in. As a result of that accident, Willow Valley received a new name and to this day is known as Cache Valley.

History repeats itself. On Wednesday, September 19, 1979, a sewer trench wall collapsed and buried a construction worker under several feet of loose earth. The accident occurred at a new home under construction in a subdivision north

of Riverton, Utah. UGMS geologists Bill Lund and Bob Klauk, at the request of the Utah State Industrial Commission, visited the site the day after the accident in an attempt to determine the cause of the cave-in. Direct observation was not possible; the trench had been backfilled after the rescue to prevent further collapse.

According to rescue workers, the vertical walls of the 12-to 13-foot deep trench exposed two to three feet of loose fill over a very stiff clay deposit. A rescue worker indicated that at the point where the cave-in occurred, at least a portion of the trench wall that collapsed consisted of fill material that had been placed in a trench previously excavated in the same site. He further stated that the in-place material adjacent to the fill appeared to be "rotten", possibly due to the infiltration of surface water along the contact with the older fill material. Two or three feet of soupy mud were reported at the bottom of the trench by the rescue workers, indicating that the trench had reached the water table.



Collapsed and back-filled trench at homesite north of Riverton, Utah.

## DR. WARD HONORED

Dr. Stanley H. Ward, chairman of the department of Geology and Geophysics, has been elected second vice-president of the Society of Exploration Geophysicists for the year 1979-80.

## STUDENTS WIN HONORS

Two Utah students received awards at the International Science and Engineering Fair held in San Antonio, Texas, May 10, 1979. Jeffrey W. Bybee, Clearfield, Utah, won fourth place, a \$100.00 check from the Gulf Coast Association of Geological Societies, for his paper, "Great Salt Lake Erosion and Development". Fifth place was awarded to David Paul Butts, Ogden, Utah, for his paper, "Surface and Subsurface Coriolis in Great Salt Lake". The award was a \$50.00 check from the South Texas Geological Society.

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